bioEnergy! works

Another RBEP Success:
Bringing "green machines" to national parks, part 1: cleaner, quieter snowmobiles

The Regional Biomass Energy Program (RBEP) promotes increased production and use of bioenergy resources, and helps advance the use of renewable biomass feedstocks and technologies. Historically, the RBEP leverages two nonfederal dollars for every federal dollar it administers.

Benefits of Bio-based Fuels and Lubricants in Snowmobiles

- *A 10% ethanol fuel blend reduces hydrocarbons (HC) 16-25%, decreases particulates 25-30%, and reduces carbon monoxide (CO) 9-20%*
- *Bio-based lubricants reduce CO 25-38% and HC 16-38%*
- *Bio-based products also reduce visible smoke, increase mileage, prevent spark plug fouling and carburetor freeze-ups, reduce engine wear, and maintain or improve engine power*

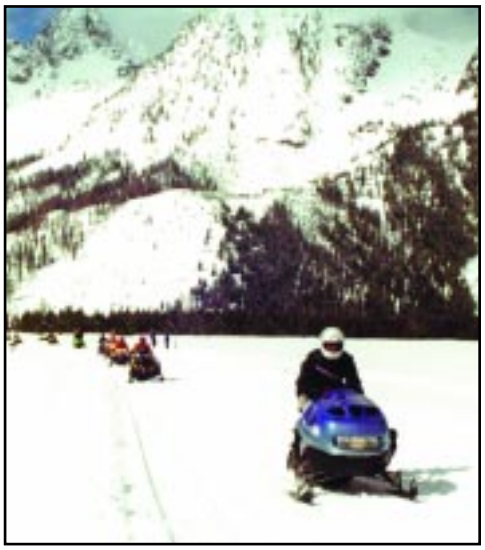
"The snowmobile industry and snowmobile riders are largely behind the efforts to develop cleaner, quieter sleds. Our new, more environmentally friendly snowmobiles have been well received by our customers riding in Yellowstone Park."

Clyde Seely, Co-Owner
West Yellowstone Artic Yamaha
Snowmobile Sales & Rentals

U.S. Department of Energy
Regional Biomass Energy Program
www.ott.doe.gov/rbep

Challenge

On winter days, as many as 2,000 snowmobiles ride through Yellowstone National Park and the surrounding national forests. Snowmobile operation can adversely affect environmentally sensitive areas due to the excessive noise and emissions produced by a conventional snowmobile's two-stroke engine. In addition to polluting the air, emissions from snowmobiles are deposited along trails and, as the snow melts, pollutants can enter waterways, negatively impacting aquatic species.



To help the National Park Service avoid restricting snowmobile use in Yellowstone National Park, the U.S. Department of Energy's Regional Biomass Energy Program (RBEP) provided funding for snowmobile emissions research and to demonstrate the benefits of using bio-based fuels and lubricants over a 5-year period.

RBEP Solution

Led by RBEP, a partnership of public and private national and local organizations joined forces to conduct research on the effects of bio-based fuels and lubricants on snowmobile emissions.

The Montana Department of Environmental Quality conducted laboratory emissions testing at Southwest Research Institute. Two of the most common snowmobile engines operated in the Yellowstone region were tested using bio-based fuel: a fan-cooled 500cc Polaris engine and a liquid-cooled 440cc Artic Cat engine.

Awards

1996 EPA Region VIII Environmental Stewardship Award

1997 Conoco President's Award for the Environment

1997 DuPont President's Award for Safety and the Environment

2000 U.S. Department of Energy Outstanding Achievement Award

2001 Closing the Circle Award

2001 National Park Foundation Award (Honorable Mention)

Partners

U.S. Department of Energy Regional Biomass Energy Program

Society of Automotive Engineers Foundation

U.S. Environmental Protection Agency

Montana Department of Environmental Quality

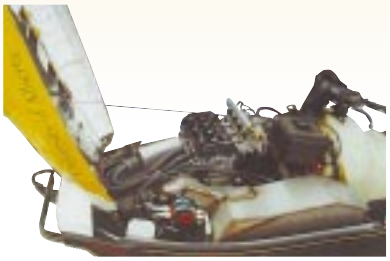
Wyoming Department of Environmental Quality

U.S. Department of the Interior, National Park Service

Yellowstone National Park

International Snowmobile Manufacturers Association

Montana Snowmobile Association



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To demonstrate that cleaner and quieter snowmobiles can be made economically, the Clean Snowmobile Challenge (CSC) was developed by the Society of Automotive Engineers Foundation with support from the U.S. Environmental Protection Agency (through the Montana Department of Environmental Quality) and more than fifty other sponsors, including RBEP. The CSC is an annual college-level competition inviting teams of students to design a touring snowmobile that is quieter and less polluting, with performance equal to or better than existing snowmobiles. The modified snowmobiles must be cost-effective so that snowmobile outfitters can operate them profitably.

Results

The laboratory testing and subsequent field tests showed that bio-based fuels and lube oils reduced harmful emissions and visible smoke, while increasing gas mileage. They also prevented spark plug fouling and carburetor freeze-ups.

As a result of the project, most of the snowmobiles operating in the Yellowstone area now use a 10% ethanol (E10) gasoline blend to help protect air and water quality, as well as synthetic biodegradable lube oils. Most service stations in the area now offer E10 fuel. The laboratory test data have been made available to snowmobile manufacturers to use in determining the best combination of fuel and synthetic lube oil for their equipment.

Benefits

This unique effort united groups representing diverse interests toward a common goal of improving air quality in one of the nation's premier national parks. The project successfully demonstrated the benefits of using bio-based fuels and lubricants to reduce the environmental impact of snowmobiles. In addition, the snowmobile industry has benefited from the knowledge advanced by engineering students working to develop new designs.